

NON-PUBLIC?: N  
ACCESSION #: 9212240091  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Seabrook Station PAGE: 1 OF 04

DOCKET NUMBER: 05000443

TITLE: Reactor Trip Resulting from Spurious OPDT Signal  
EVENT DATE: 11/27/92 LER #: 92-024-00 REPORT DATE: 12/27/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: Mr. James M. Peschel, Regulatory COMPLIANCE: (603) 474-9521  
Compliance Manager, ext. 3772

COMPONENT FAILURE DESCRIPTION:  
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:  
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

On November 27, 1992 at 1519 a reactor trip occurred from 100% power. The reactor trip was due to a spurious signal in the Reactor Coolant System (RC) Overpower Delta T (OPDT) protection circuit. This event was reported to the NRC pursuant to 10CFR50.72(b)(2)(ii) as an automatic actuation of the Reactor Protection System and Engineered Safety Feature (ESF) System.

The OPDT protection circuit is designed to provide assurance of fuel integrity under all possible overpower conditions and receives inputs from Delta T and T sub AVG. A two of four coincidence is required to initiate a reactor trip. At the time of the event the RC Loop 1 OPDT channel was in test to perform a setpoint adjustment. With this channel in test actuation of only one of the three remaining channels is required to initiate a reactor trip. At 1519 a spike on the RC Loop 4 OPDT channel made up the required coincidence and initiated a OPDT reactor

trip.

The plant response to the trip was normal and no unexpected transients were observed. The cause of the event is attributed to an erratic setpoint voltage being generated by RC Loop 4 OPDT circuit card. This caused the RC Loop 4 OPDT trip setpoint to spike below actual Delta T. As a result of having the Loop 1 OPDT channel in test, when the Loop 4 setpoint signal went below the actual Delta T value the required OPDT reactor trip coincidence was made up and a reactor trip occurred.

Corrective action was to replace the faulty circuit card. There were no adverse safety consequences as a result of this event. At the time of the event the plant was in Mode 1 at 100% power. This is the first event at Seabrook Station where a spurious OPDT signal caused a reactor trip.

END OF ABSTRACT

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On November 27, 1992 at 1519 a reactor trip occurred from 100% power. The reactor trip was due to a spurious signal in the Reactor Coolant System (RC) Overpower Delta T (OPDT) protection circuit. This event was reported to the NRC pursuant to 10CFR50.72(b)(2)(ii) as an automatic actuation of the Reactor Protection System and Engineered Safety Feature (ESF) System.

#### Background Information

The OPDT protection circuit provides assurance of fuel integrity under all possible overpower conditions, limits the required range for the Overtemperature Delta T trip, and provides a backup for the High Neutron Flux Trip. The setpoint is automatically varied with RC temperature, and rate of change of RC temperature. Four separate OPDT setpoints are continuously calculated; one for each of the four reactor coolant loops. The inputs to each setpoint calculation are unique to the loops trip circuit. Should the actual Delta T for the loop exceed the setpoint, the loop OPDT bistable will trip. A reactor trip then occurs when any other loop exceeds its setpoint (two of four coincidence).

Prior to the trip, plant technicians were performing a minor calibration on the RC Loop 1 Delta T/T sub AVG Protection Channel 1. In accordance with station procedures the comparator trip switch for the Loop 1 OPDT reactor trip was placed in the Test position. Placing this switch in the Test position trips the associated OPDT reactor trip bistable. In this configuration actuation of only one of the other three OPDT reactor trip

channels would be required to initiate a reactor trip. On November 27, 1992 at 1519 a spike on the RC Loop 4 OPDT channel made up the required coincidence and initiated a OPDT reactor trip.

The plant response to the trip was normal and no unexpected transients were observed. Steam dump operation was normal and no main steam safety valves lifted. The plant cooldown immediately following the trip was not rapid and the main steam isolation valves were not required to be closed. This unit trip was the first from 100% power that did not involve a Feedwater Isolation (FWI) Signal at the time of the trip. The rapid closure of the turbine stop valves during the trip produce HI-HI steam generator level signal spikes, which in the past, have generated a FWI signal on HI-HI steam generator level. A design change, which filters the signal spike, prevented a FWI, due to HI-HI steam generator level, from occurring during the event. A FWI occurred later in the event due to the P-4 (reactor trip breakers open) signal coincident with low T sub AVG. In addition, an Emergency Feedwater (EFW) actuation occurred as a result of the reactor trip. Both the FWI, on P-4 coincident with low T sub AVG, and the EFW actuation were expected plant responses based on a trip from 100% power.

Due to a blown control power fuse, a motor operated extraction steam isolation valve did not close as designed during the event. In addition, a vital inverter transferred to its DC power source due to a voltage transient resulting from the event. Neither of these items were a precursor to the RC Loop 4 OPDT setpoint spike nor did they adversely impact plant response to the event.

After the trip the plant was placed in HOT STANDBY in accordance with operating procedure OS1000.11, "Post Trip To Hot Standby" and an event evaluation and post trip review were initiated.

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### Safety Consequences

There were no adverse safety consequences as a result of the event. Operator response to the event was appropriate to ensure the safety of the plant. At no time during the event was there any adverse impact on the health and safety of plant employees or the public.

### Root Cause

The cause of the reactor trip was a signal spike on the Loop 4 OPDT protection circuit coincident with the Loop 1 OPDT protection circuit being in Test. The cause of the Loop 4 OPDT signal spike is attributed

to an erratic setpoint voltage being generated by an OPDT 7300 signal comparitor circuit card. Specifically, a voltage bias signal, normally set at zero, spiked causing the OPDT signal to be at the value required to initiate a reactor trip. This caused the Loop 4 OPDT setpoint to spike below actual Delta T which made up the two of four coincidence and initiated a reactor trip (see Figures 1 and 2).

#### Corrective Action

Corrective action was to replace the failed OPDT circuit card. This card was calibrated and tested prior to plant restart. In addition, the blown fuse on the motor operated extraction steam isolation valve was replaced. A cause determination for the fuse failure is being performed. It is expected that the determination will be completed by December 31, 1992.

#### Plant Conditions

At the time of the event the plant was in Mode 1 at 100% power, with RCS temperature at approximately 587 degrees F and pressurizer pressure at approximately 2235 psig.

This is the first event at Seabrook Station where a spurious OPDT signal caused a reactor trip.

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Figures 1 and 2 omitted. (no descriptions)

ATTACHMENT 1 TO 9212240091 PAGE 1 OF 2

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Ted C. Feigenbaum  
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NYN-92170

December 23, 1992

United States Nuclear Regulatory Commission  
Washington, D.C. 20555

Attention: Document Control Desk

Reference: Facility Operating License No. NPF-86, Docket No. 50-443

Subject: Licensee Event Report (LER) 92-24-00: Reactor Trip  
Resulting from Spurious OPDT Signal

Gentlemen:

Enclosed please find Licensee Event Report (LER) No. 92-24-00 for Seabrook Station. This submittal documents a Reactor Trip and Engineered Safety Feature actuation which occurred on November 27, 1992. This event is being reported pursuant to 10CFR50.73(a)(2)(iv). This event was previously reported by North Atlantic as a non-emergency four hour report, pursuant to 10CFR50.72(b)(2)(ii), on November 27, 1992.

Should you require further information regarding this matter, please contact Mr. James M. Peschel, Regulatory Compliance Manager at (603) 474-9521 extension 3772.

Very truly yours,

Ted C. Feigenbaum  
TCF:MDO/act

Enclosure Form 366, 366A

a member of the Northeast Utilities system

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United States Nuclear Regulatory Commission December 23, 1992  
Attention: Document Control Desk Page two

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